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CASE REPORT

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Trans-trapezium carpo-metacarpal dislocation of the thumb

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Abstract We report a case of carpo-metacarpal dislocation associated with an isolated horizontal fracture of the trapezium. It is a rare lesion which is difficult to diagnose by standard radiography, and CT may be necessary for the diagnosis and correct treatment. In our case, stable osteosynthesis was achieved by internal screw fixation, and at follow-up there was an unrestricted, painless range of motion of the thumb.

Keywords Horizontal fracture · Carpo-metacarpal dislocation · Trapezium

Introduction

Isolated fractures of the trapezium are rare and often unrecognised [1, 2, 3, 5, 9, 11, 12]. The usual classification, like the one proposed by Walker et al. (Fig. 1) [12], distinguishes between trapezial ridge and body fractures. Most are described as vertical fractures, and only a few cases of horizontal fractures have been reported [11, 12]. Isolated fractures of the trapezium are easily missed on routine radiographs, and if a fracture is suspected, CT may be essential for the diagnosis and proper management.

The mechanism of injury and subsequent management of avulsion fractures and ridge fractures differ greatly from those of the trapezial body [9, 10, 11, 12]. We describe a case of trans-trapezium carpo-metacarpal dislocation of the thumb.

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Case report

A 20-year-old, right-handed woman attended our emergency unit for pain and functional impairment of the thumb 1 day after a fall while holding the handle of a bucket in her right hand. Clinically, there was swelling and tenderness of the first metacarpal and the radial aspect of the wrist of her right hand. Radiographs were initially recorded as normal, the wrist was immobilised in a splint, and the patient referred to the hand clinic. On review, we suspected a fracture of the trapezium (Fig. 2a), and a spiral CT scan was performed. This demonstrated an almost horizontal subchondral fracture of the trapezium with dorsal carpo-metacarpal dislocation (Fig. 2b). Open reduction and internal screw fixation (Fig. 3) were performed through a dorsal approach, achieving an excellent result for both fracture and joint stability. The thumb was immobilised in a thumb spica for 4 weeks; after that free mobilisation was commenced. At the 12-month follow-up, clinical examination showed an unrestricted, painless range of motion of the thumb: palmar abduction 75°, radial abduction 55°, complete and symmetrical opposition and retropulsion. The carpo-metacarpal articulation of the thumb was perfectly stable. Grip strength was 40 kg against 36 kg on the uninjured left side, the pinch power was 8 kg on both sides. Anteroposterior (AP) and lateral X-rays showed healing of the fracture and no secondary displacement (Fig. 4).

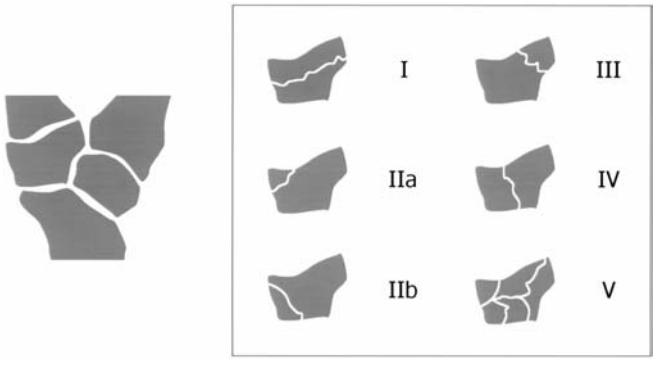

Fig. 1 Classification of trapezium body fractures as proposed by Walker et al. [12]

Fig. 2 **a** Anteroposterior (AP) and lateral radiographs centered on the radial aspect of the wrist show a likely fracture of the trapezium. **b** Reconstructed 2D coronal and 3D CT images show a horizontal fracture of the trapezium (*arrows*) with carpo-metacarpal dislocation of the thumb

Fig. 3 Postsurgical AP and lateral wrist radiographs

Discussion

Fractures of the trapezium are uncommon and comprise about 3% of all carpal bone fractures in large series [2, 3, 5, 11, 12]. Most frequently reported cases refer to vertical fractures [11, 12], and the classification of trapezial body fractures proposed by Walker et al. [12] (Fig. 1) does not include a description of horizontal luxated fractures. To our knowledge, no other cases of trans-trapezium carpo-metacarpal dislocation have been reported. Routine AP and lateral radiographs of the wrist often fail to show these fractures because of the overlapping trapezoid. Special radiographic views have been described [11, 12], but in our patient CT was essential for the diagnosis and proper treatment of this injury.

The mechanism of injury reflects the commissural shearing mechanism described by Monsch [10, 11, 12], where a commissural shearing force is produced by the fall of the body against an object fixed in the first web space, as occurred in our patient by falling while holding the handle of a bucket in her hand.

Fig. 4 AP and lateral wrist radiographs at 12-month follow-up

Different techniques have been proposed to achieve a stable osteosynthesis [4, 6, 7, 8, 9, 11, 12], and the treatment outcome also depends on displacement or fracture comminution. In our case, the axial traction of the tendon abductor pollicis longus at its metacarpal insertion is responsible for the dorsal luxation, necessitating accurate reduction and stable fixation. Revision of the palmar oblique ligament, which is essential for stability in the trapezio-metacarpal joint, should be performed if any instability is noticed after osteosynthesis. In our case, no revision was necessary since ligament rupture is unlikely in a trans-osseous fracture-dislocation, and the joint was perfectly stable after fracture fixation.

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